

N3292x Development Board User Manual

**NHS-N3292x-1-PC-2M02
NHS-N3292x-1-PC-2D02
NHS-CMOS-1-PC-2D12**

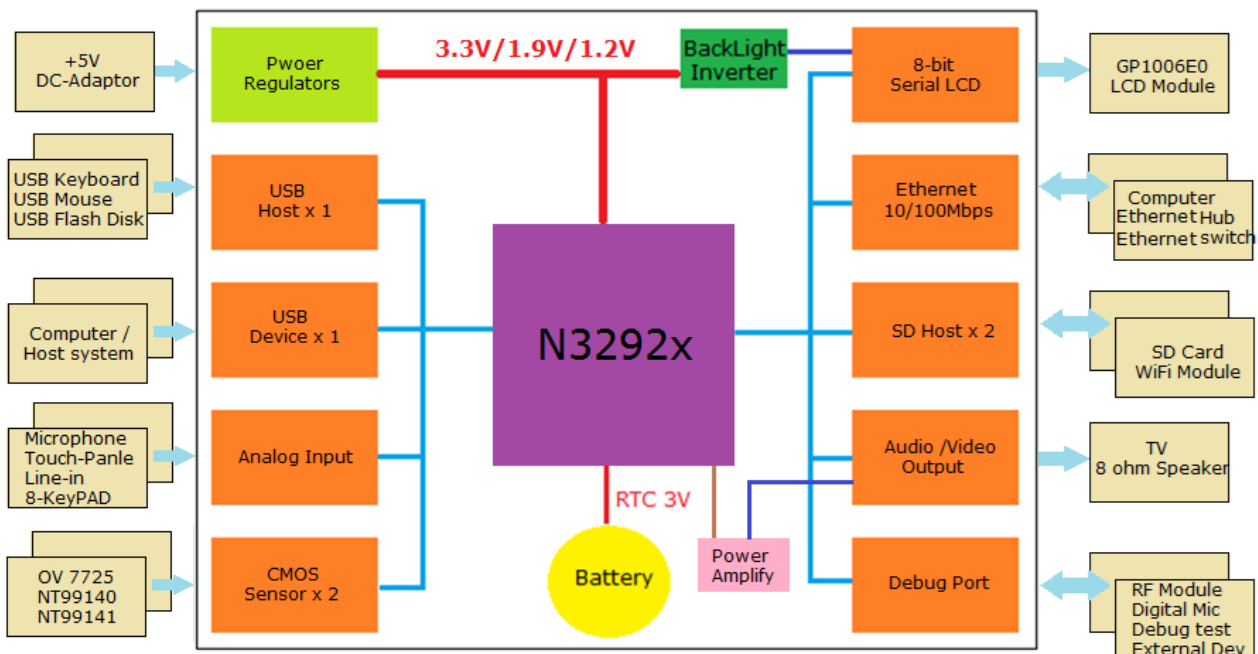
Ver:2.0

Edit version	
Ver	Description
1.0	Preliminary
1.1	Add USB2.0 Host/Device signal quality report
2.0	Update All circuit

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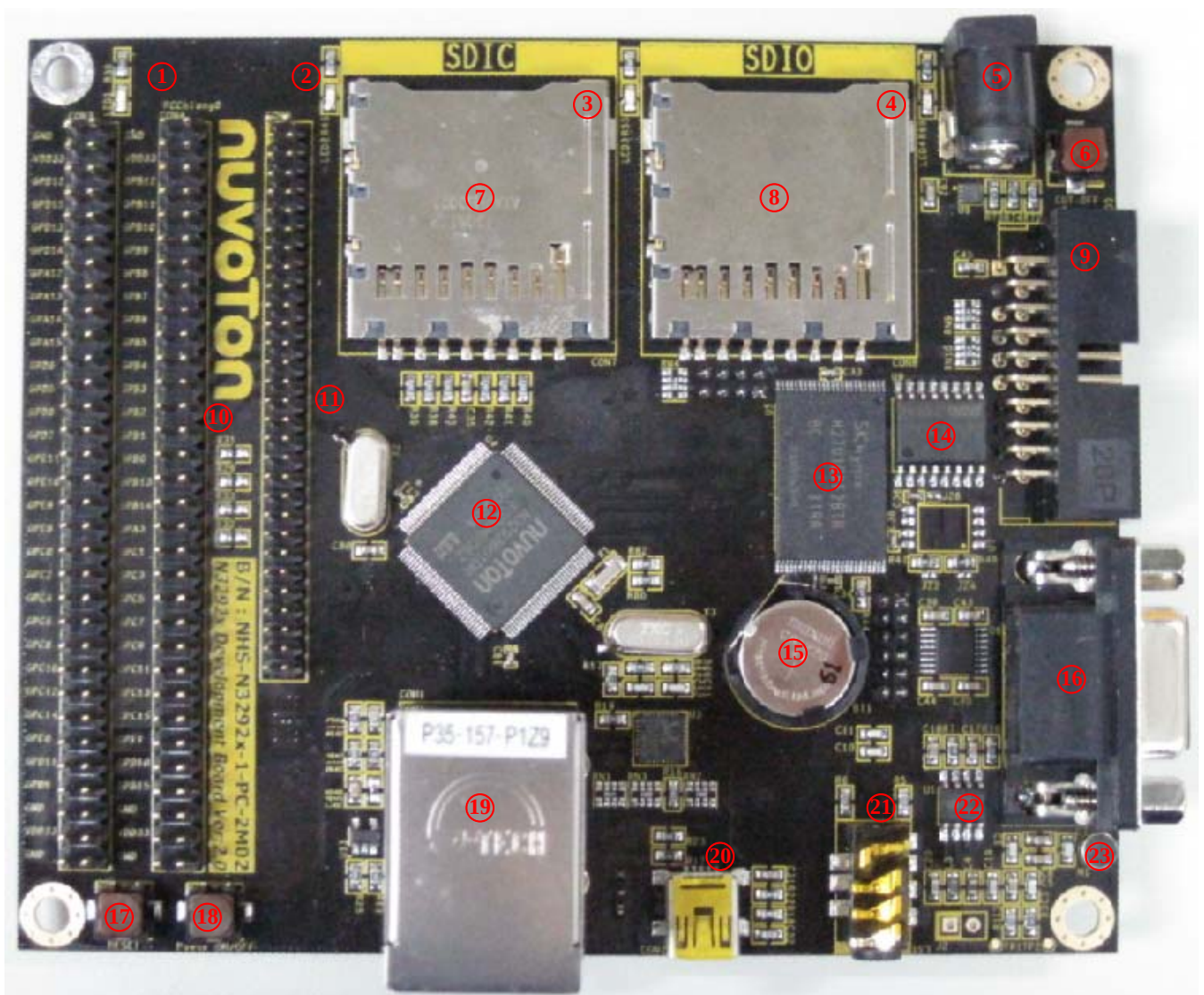
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1. N3292x Development Board Function Block:



2. NHS-N3292x-1-PC-2M02 Function Description:

2.1.Front view:



- ① **Power Ready indicator:**
Always lights on if system power ready.
- ② **The SDIC Plug-in indicator:**
The SD card into the SDIC slot indicator will light on.
- ③ **The SDIO Plug-in indicator:**
The SD card into the SDIO slot indicator will light on.
- ④ **Power Fail indicator:**
If the external voltage is too high or over current indicator will light on.
- ⑤ **Power Adaptor jack:**
Use 5V power adaptor with 2.0mm head.
Fig1. Reference Polarity.
- ⑥ **Cut off power adaptor (CON11) switch:**
Press the button key will cut off the power adaptor source.
- ⑦ **SDIC SD Card Slot:**
Provide main chip SDIC function.
- ⑧ **SDIO SD Card Slot:**
Provide main chip SDIO function.
※ If you want to use SDIO must be confirmed whether the touch-panel component removed.
- ⑨ **ARM JTAG interface:**
Software development and debug N3292x interface.
- ⑩ **Debug port:**
Most of the pin from main chip and provide debugging or developing.
- ⑪ **NHS-N3292x-1-PC-2D02 connector:**
Connected to the daughter board.
- ⑫ **Nuvoton N3292x chip:**
Main chip.
- ⑬ **NAND Flash interface:**
Provide 8 bit interface NAND type flash.
- ⑭ **SPI Flash interface:**
Provide 1/2/4 bit and SO-8/16 package type SPI flash.
※ If you want to use SPI0 must be confirmed whether the digital microphone component removed.
- ⑮ **CR1220 battery:**
Provide 3V to W55F92 RTC.
- ⑯ **RS-232 Interface:**
Provide normal speed and high-speed interface.

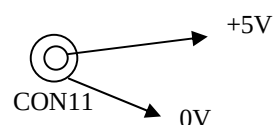


Fig1. Power adaptor input

- ⑰ **Reset switch:**
Press the button key will reset system.
- ⑱ **System wake-up and power-down switch:**
Press the button key will be through RTC wake-up and power-down system power.
- ⑲ **Communication interface:**
Provide RJ-45 and an USB2.0 host interface.
- ⑳ **USB Device interface:**
Provide USB2.0 device interface.
- ㉑ **Headphone interface:**
Stereo headphone output and headphone detected function.
- ㉒ **Speak interface:**
Provide 1.5W power and can drive 8 or 4 ohm speakers.
- ㉓ **Microphone interface:**
4mm microphone.

- ① SDIO card detected function:
Enable/Disable card detected function (J23).
- ② Power-on setting select:
Table as Fig. 2

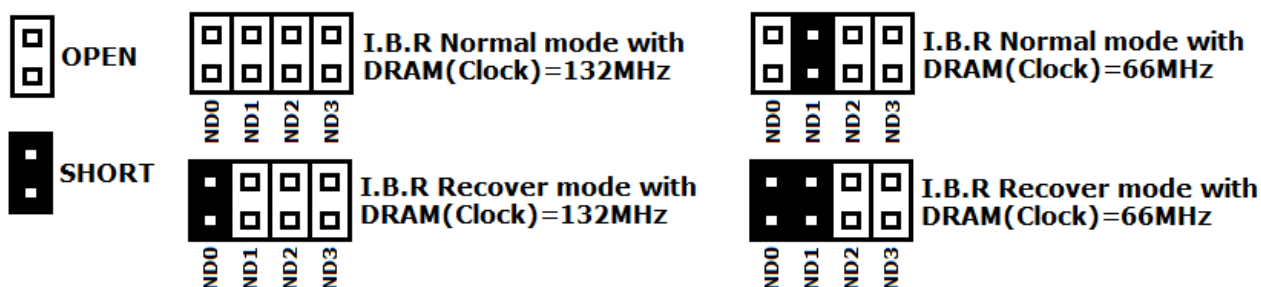


Fig. 2

- ③ NAND Flash PRE setting:
This will enable NAND flash PRE function if J19 is short.
✗ NAND flash must provide this function, Otherwise no effect.
- ④ RS-232 normal and high speed functions select:
Table as Fig. 3

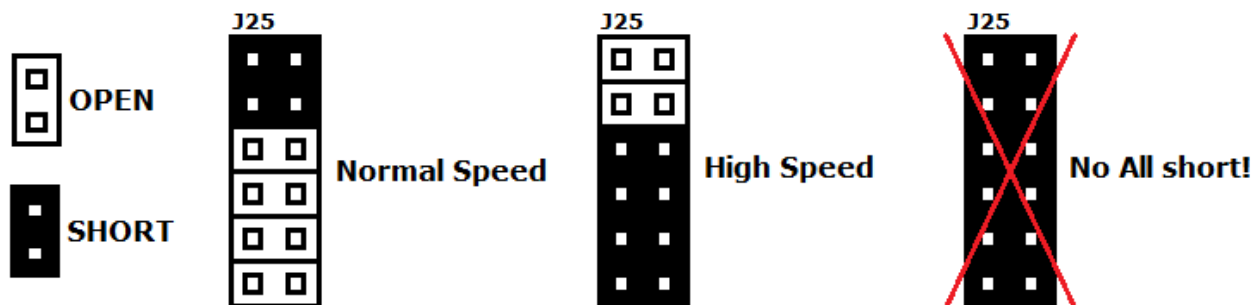


Fig. 3

- ⑤ CMOS sensor2 or SDIO interface select:
J20 and J21 are used to select CMOS sensor2 or SDIO (SD1) interface.
✗ If use the CMOS sensor2 interface must also set ⑥.
- ⑥ EMAC or CMOS sensor2 interface select:
J6 - J15 are used to select EMAC(Ethernet) or CMOS sensor2 interface.
✗ If use the CMOS sensor2 interface must also set ⑤.
- ⑦ Power amplifier speaker enable:
This will enable ISD8101 power amplifier if J3 is short.

- ⑧ Power amplifier input source select:
(J4) Select Left or Right channel source to the power amplifier.
- ⑨ PHY interrupt interface enable:
It would interrupt to the CPU from the PHY, if J16 is short and PHY has setting this function.
- ⑩ NHS-CMOS-1-PC-2D12 connector:
CMOS sensor2 interface connected to the daughter board.
- ⑪ Microphone Bias and Line-in select:
(J1) Select Microphone Bias or Line-in interface function.
- ⑫ USB Host bus power behavior select:
Table as Fig. 4.

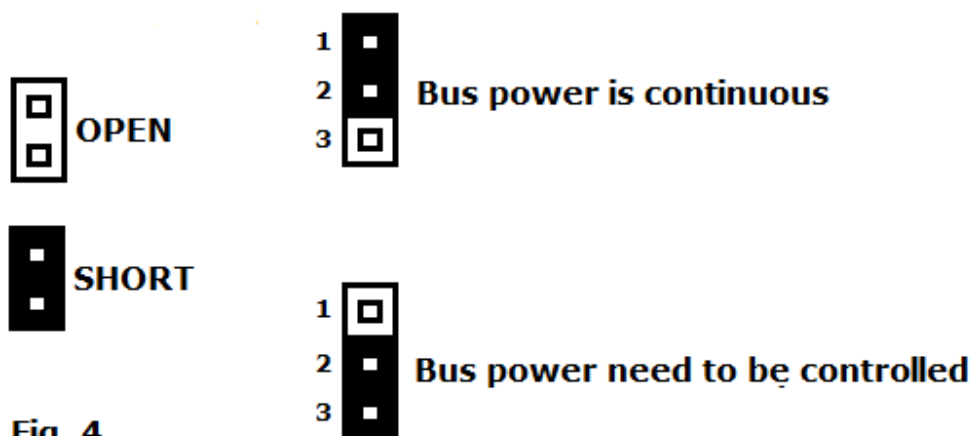
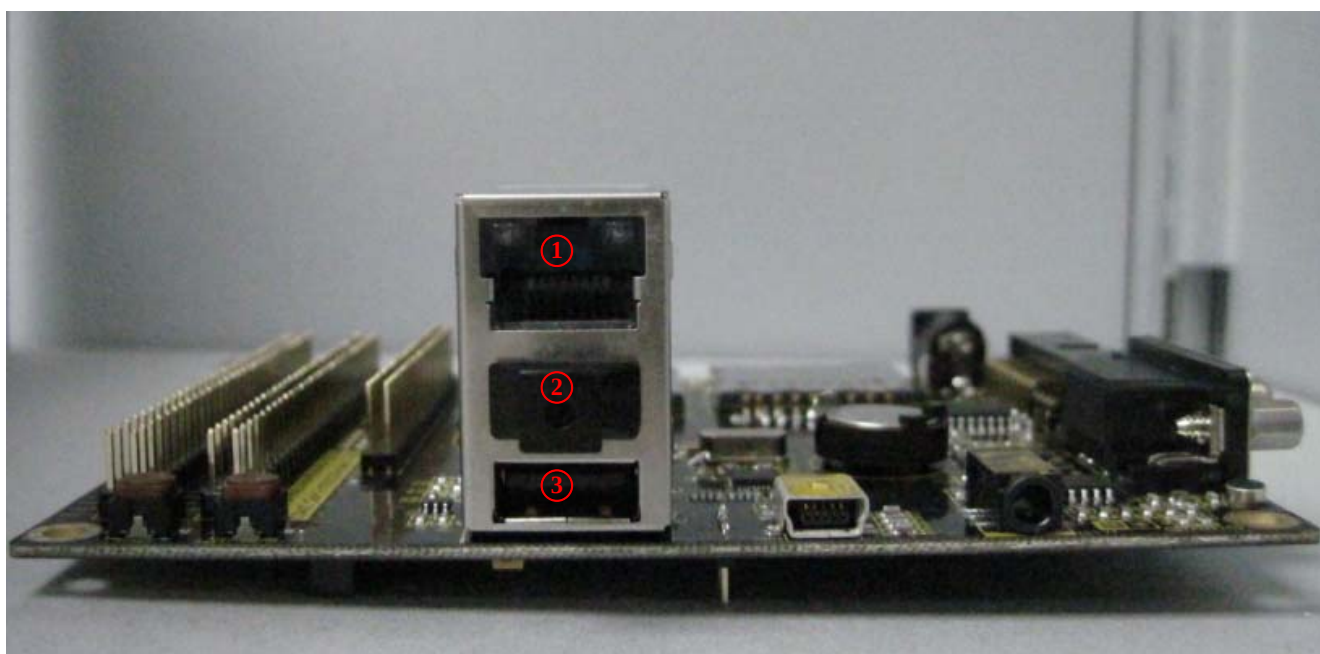


Fig. 4

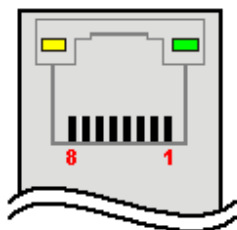
※ If you choose 2-3, The SPI flash cannot work. But the bus power can ON/OFF control from CPU.

2.3.Front side view:



① RJ-45 Interface:

It provides a standard 10/100M interface.



PCB

The LED default setting

■ 10M Link

■ 100M Link

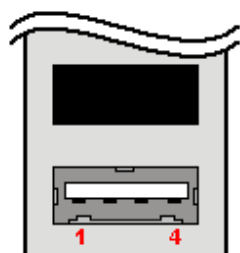
PIN	SIGNAL	PIN	SIGNAL
1	TX+	5	N.C
2	TX-	6	RX-
3	RX+	7	N.C
4	N.C	8	N.C

② Do not use:

Dummy.

③ USB Host interface:

It provides a standard USB2.0 interface.



PCB

PIN	SIGNAL	PIN	SIGNAL
1	+5.0V	3	USB+
2	USB-	4	GND

3. NHS-N3292x-1-PC-2D02 Function Description:

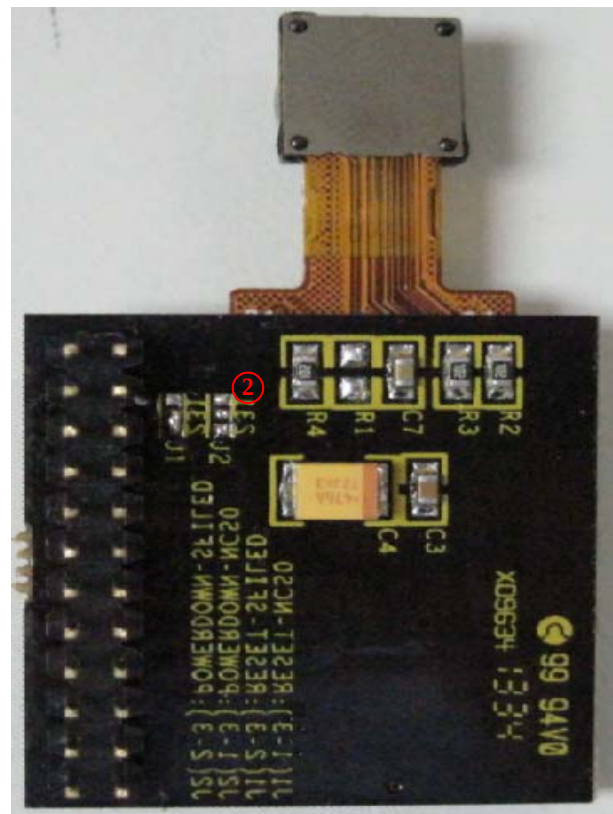
3.1.Front view:



- ① **LCD and Touch-Panel:**
Provides an 8-bit interface LCD (GPM1006E0) and an touch-panel.
✘ If you want to use touch-panel must be confirmed whether the SDIO component removed.
- ② **Digital microphone:**
Provide a digital microphone (AKU230).
✘ If you want to use digital microphone must be confirmed whether the SPI0 component removed.
- ③ **NHS-CMOS-1-PC-2D12 connector:**
CMOS sensor1 interface connected to the daughter board.
- ④ **Low voltage detected emulation:**
Providing a variable resistor to AHS pin, can simulate the behavior of an external power.
- ⑤ **Debug LED:**
Provides 8 LED as debug or development (Active Low)
- ⑥ **Analog key:**
Provides 8 analog buttons key as development.

4. NHS-CMOS-1-PC-2D12 Function Description:

4.1.Front view:



① CMOS sensor interface:

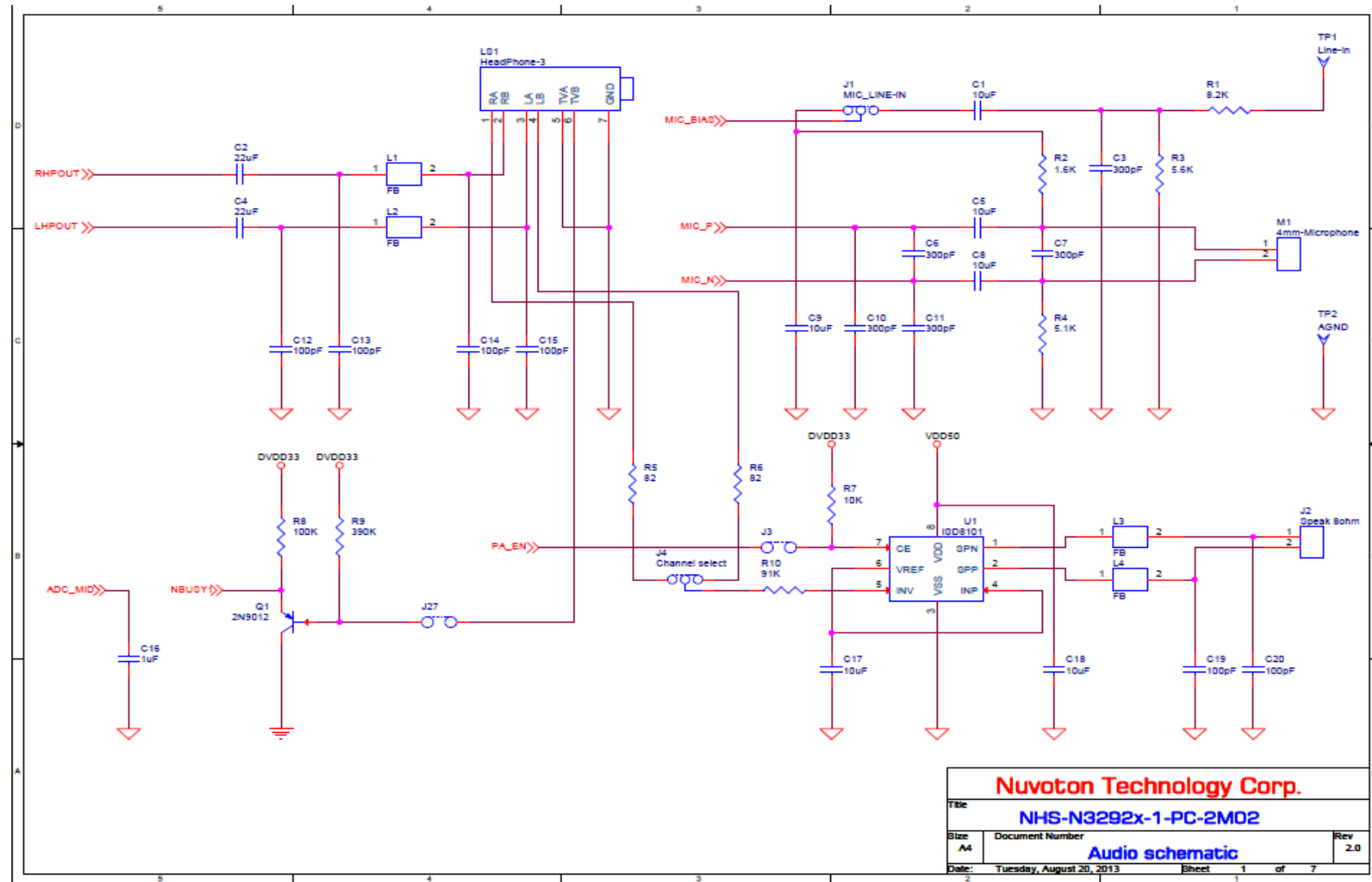
It provide 24pin CMOS sensor interface and pin outs are as follows.

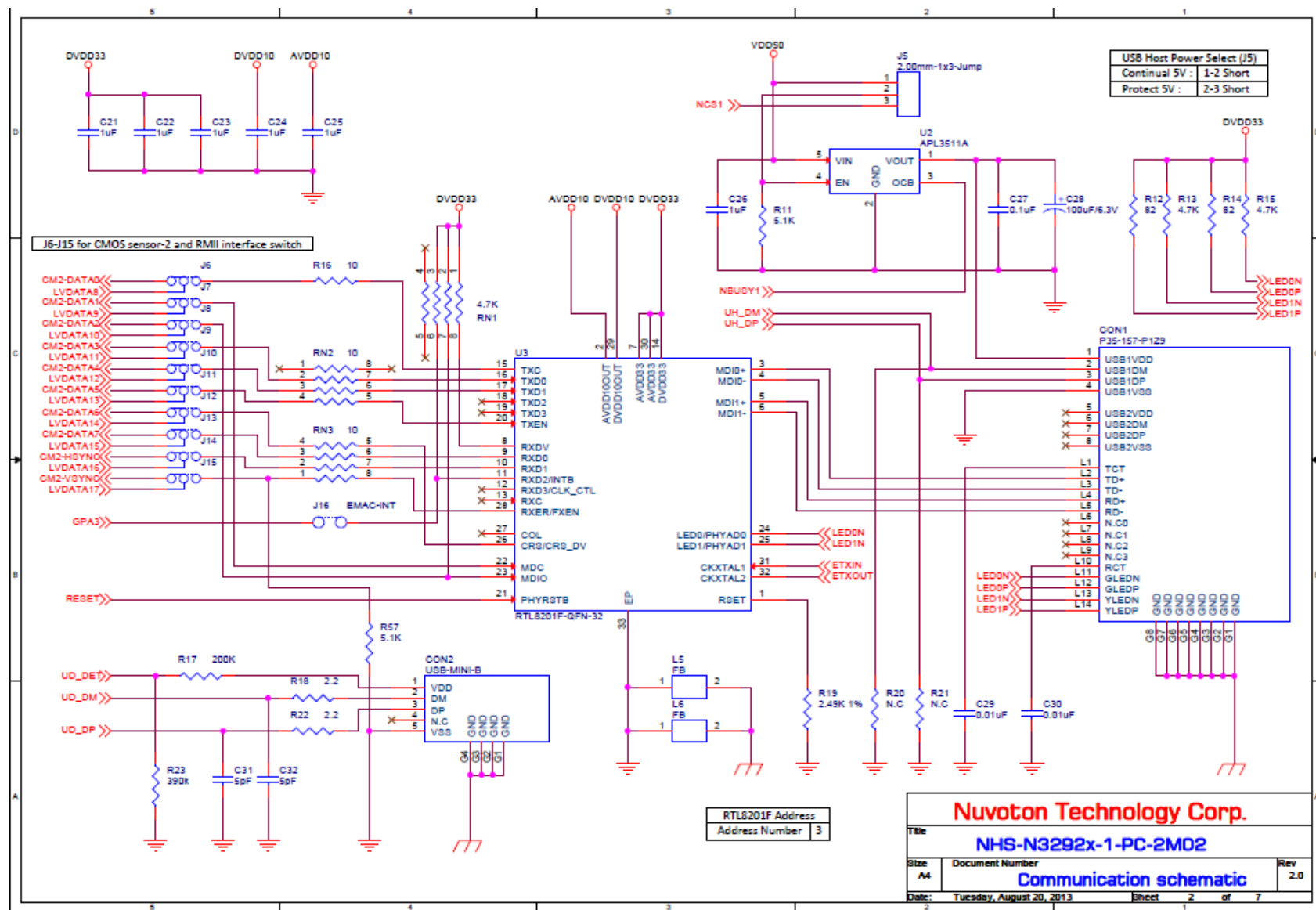
FPC-24-0.5-CMOS	
1	N.C
2	GND
3	SIOD
4	AVDD
5	SIOC
6	RESET
7	VSYNC
8	PWDN
9	HREF
10	DVDD18
11	DVDD33
12	D7
13	XCLK
14	D6
15	GND
16	D5
17	PCLK
18	D4
19	D0
20	D3
21	D1
22	D2
23	N.C
24	N.C

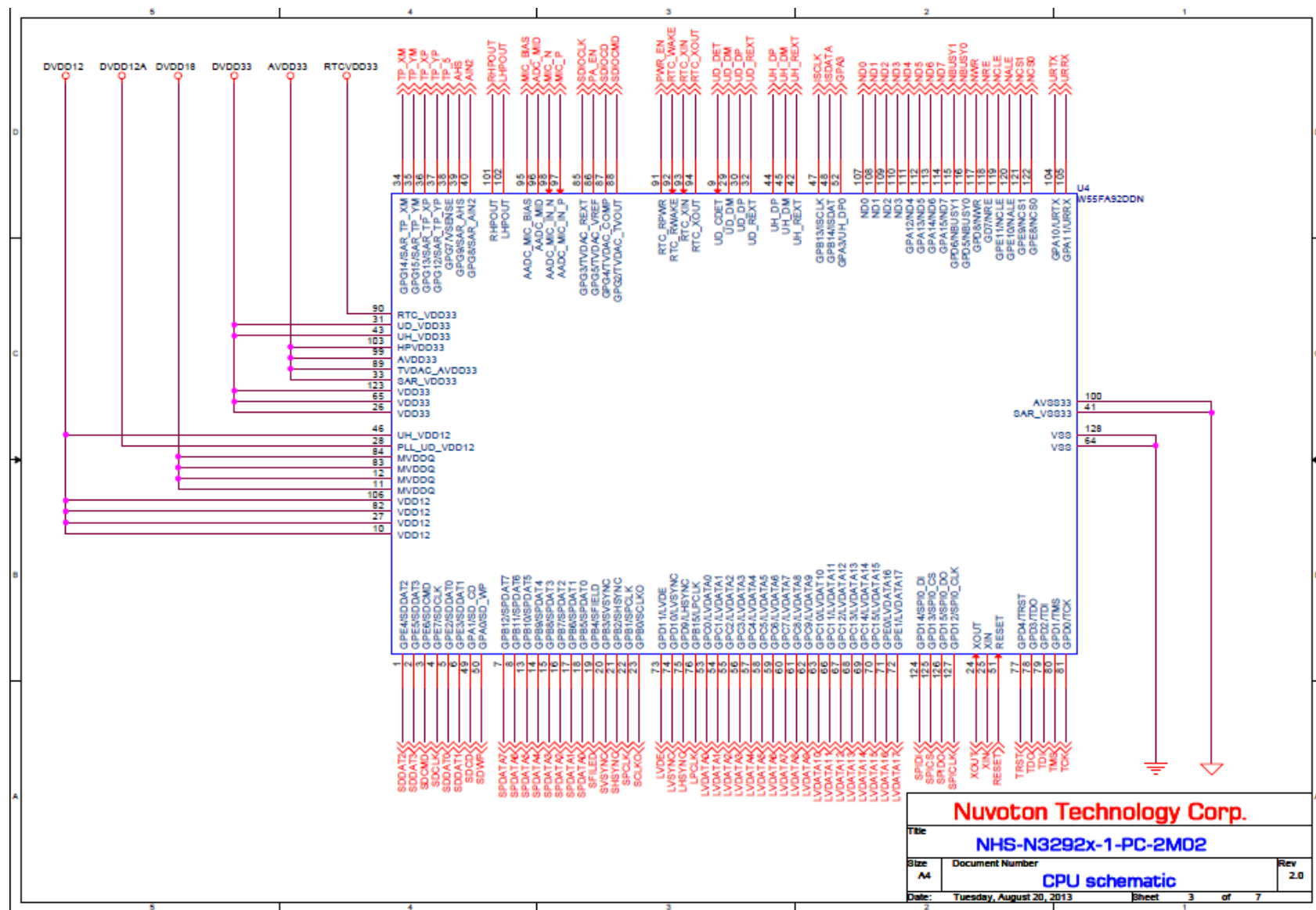
② CMOS sensor power down and reset function set:

You can use the J1 and J2 to set the pins can be controlled or use R1 and R4 fixed function.

5. NHS-N3292x-1-PC-2M02 schematic:

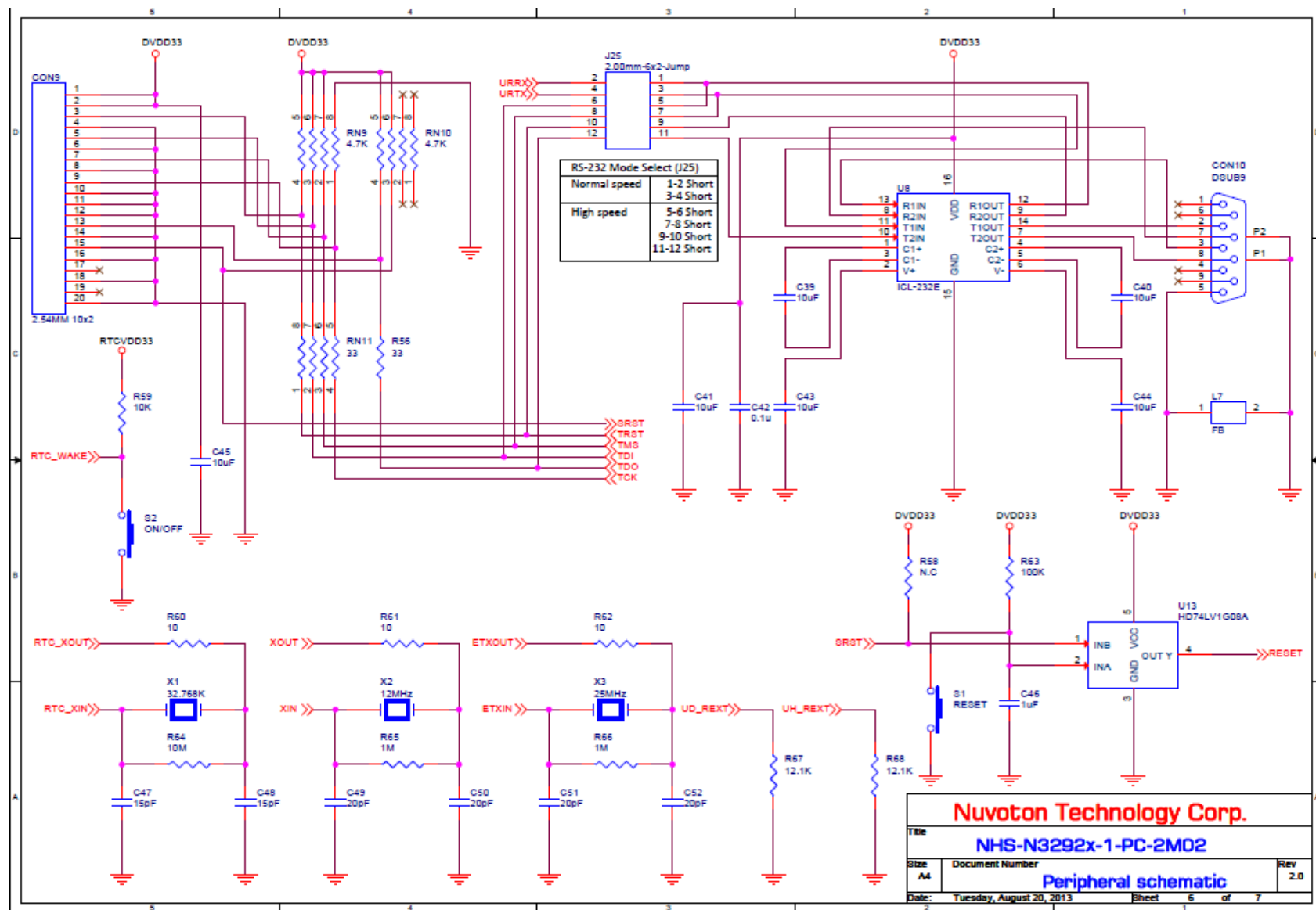


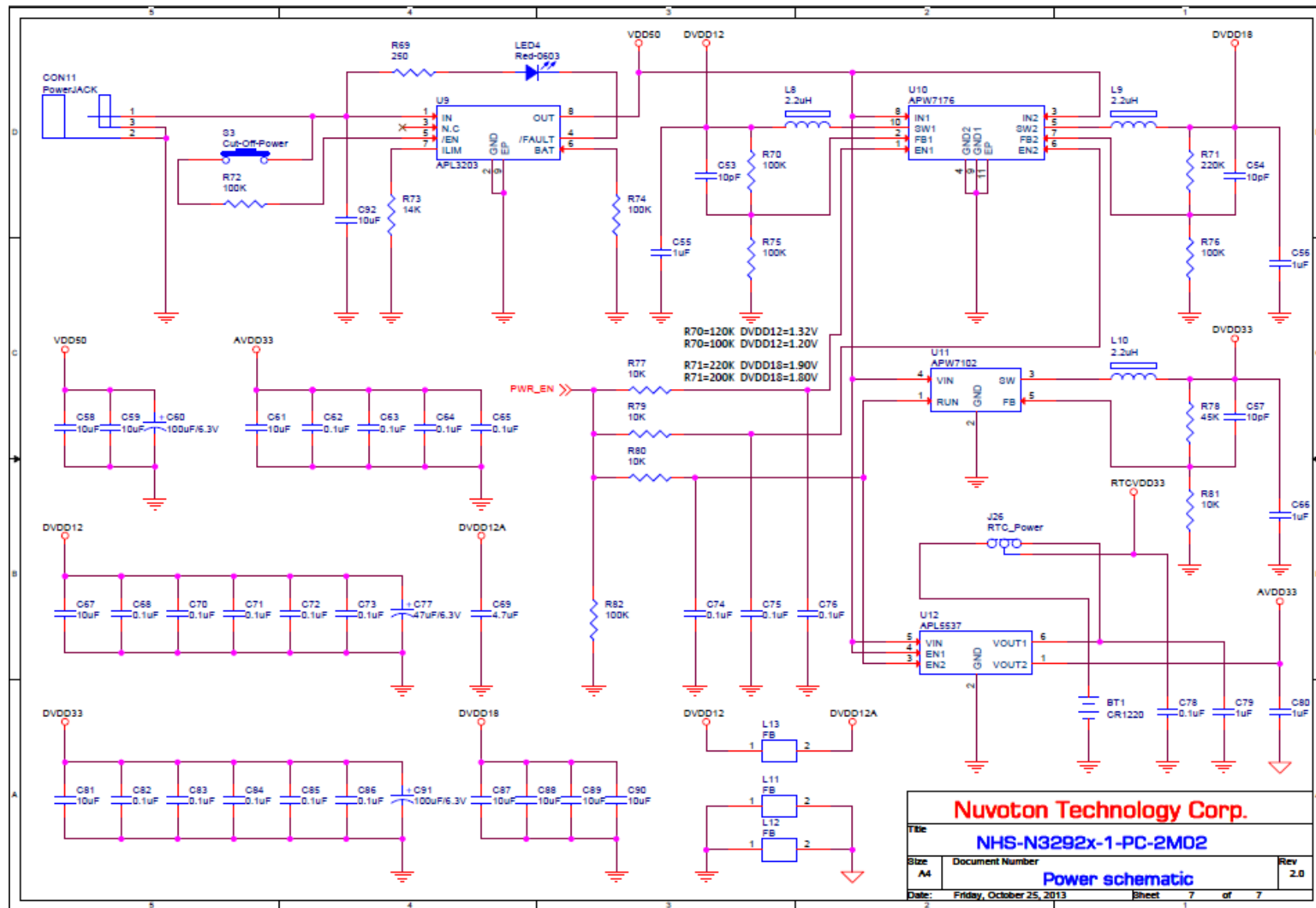




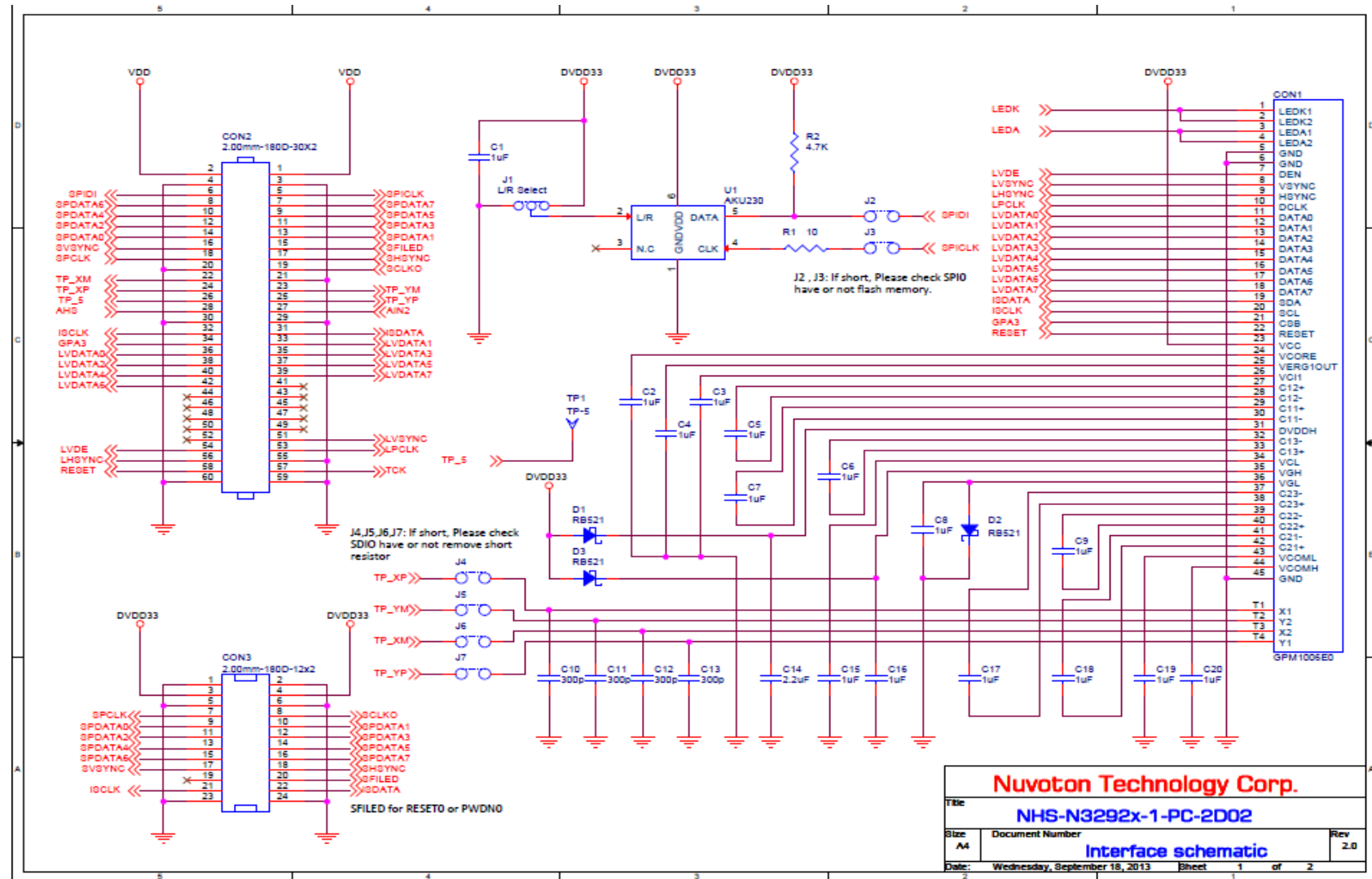


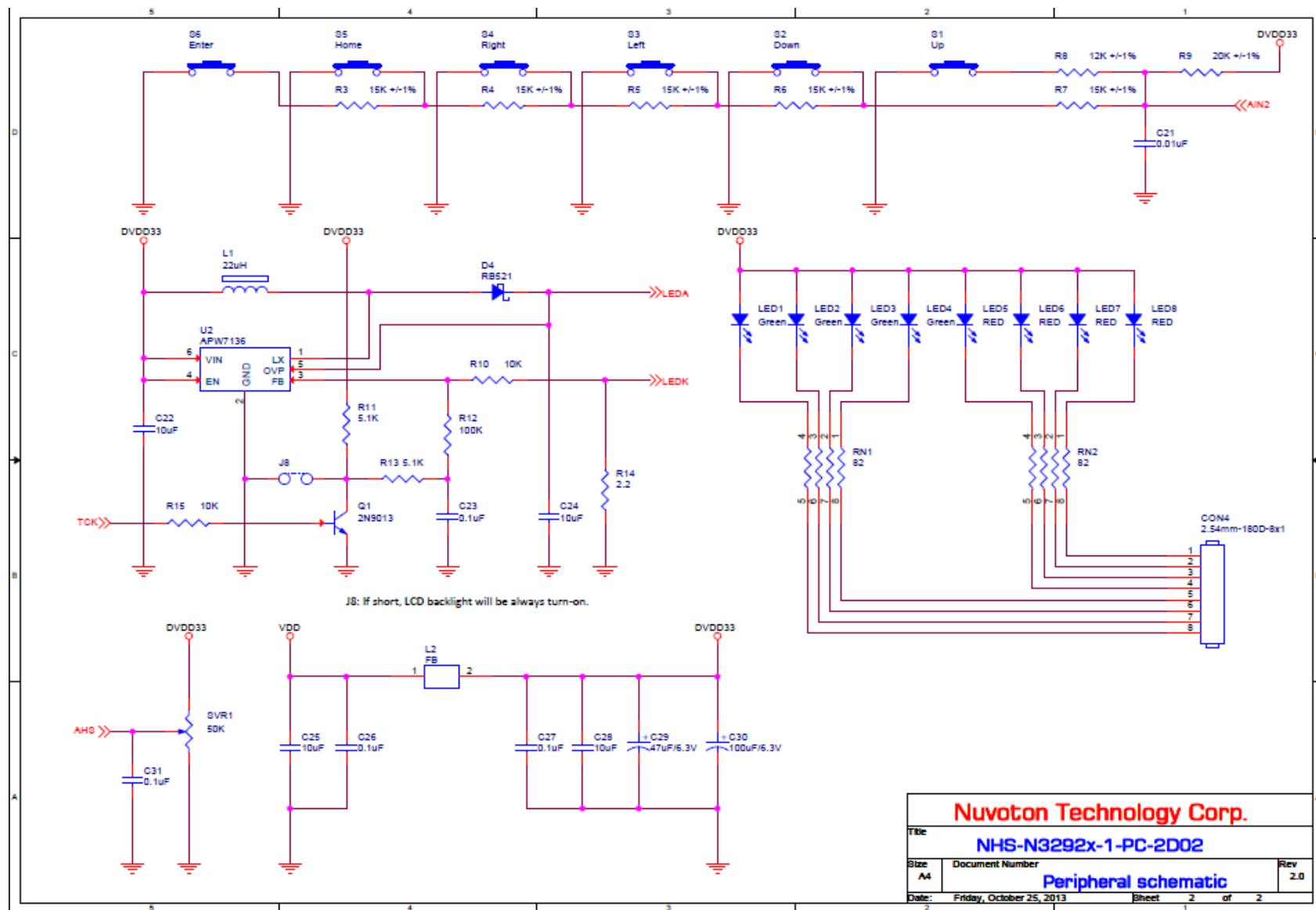






6. NHS-N3292x-1-PC-2D02 schematic:

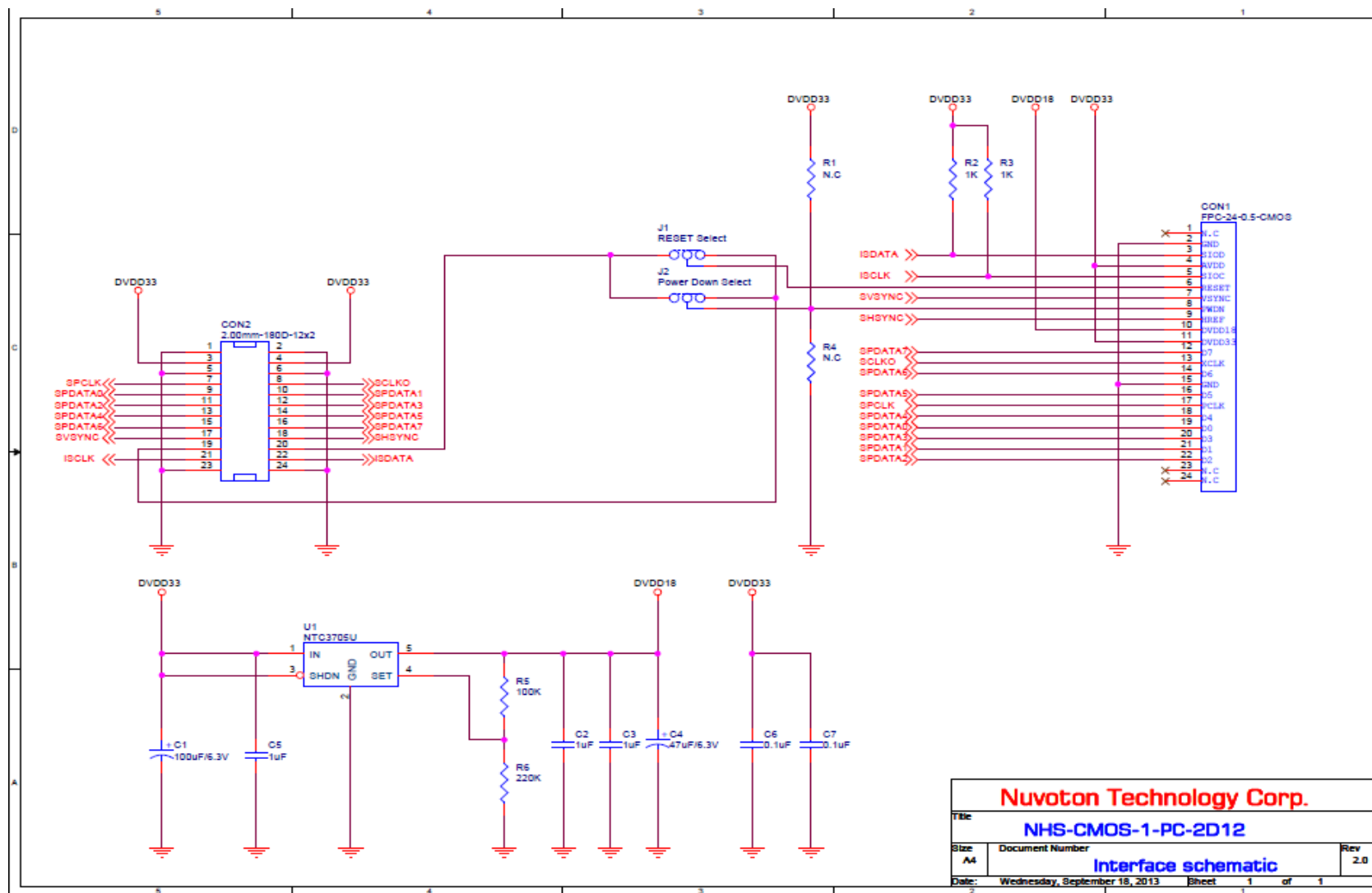




Nuvoton Technology Corp.

Title			
NHS-N3292x-1-PC-2D02			
Size	Document Number	Rev	
A4		2.0	
Date:	Friday, October 25, 2013	Sheet	2 of 2

7. NHS-CMOS-1-PC-2D12 schematic:



8. NHS-N3292x-1-PC-2M02 BoM list:

Item	Quantity	Reference	Part	Reference Link
1	1	BT1	CR1220	
2	1	CON1	P35-157-P1Z9	
3	1	CON2	USB-MINI-B	
4	2	CON3,CON4	2.54mm-180D-32x2	
5	1	CON5	2.00mm-180D-30X2	
6	1	CON6	2.00mm-180D-12X2	
7	2	CON7,CON8	Panasonic-Standard-SD	
8	1	CON9	2.54MM-10x2	
9	1	CON10	DSUB9	
10	1	CON11	PowerJACK	
11	24	C1,C5,C8,C9,C17, C18,C35,C37,C39, C40,C41,C43,C44, C45,C58,C59,C61, C67,C81,C87,C88, C89,C90,C92	10uF	
12	2	C2,C4	22uF	
13	5	C3,C6,C7,C10,C11	300pF	
14	6	C12,C13,C14,C15, C19,C20	100pF	
15	13	C16,C21,C22,C23, C24,C25,C26,C46, C55,C56,C66,C79, C80	1uF	
16	23	C27,C33,C34,C36, C38,C62,C63,C64, C65,C68,C70,C71, C72,C73,C74,C75, C76,C78,C82,C83, C84,C85,C86	0.1uF	
17	3	C28,C60,C91	100uF/6.3V	
18	2	C29,C30	0.01uF	
19	2	C31,C32	5pF	
20	1	C42	0.1u	
21	2	C47,C48	15pF	
22	4	C49,C50,C51,C52	20pF	
23	3	C53,C54,C57	10pF	

24	1	C69	4.7uF	
25	1	C77	47uF/6.3V	
26	1	J17	2.00mm-4x2	
27	1	J25	2.00mm-6x2-Jump	
28	1	LED1	Blue-0603	
29	2	LED2,LED3	Yellow-0603	
30	1	LED4	Red-0603	
31	1	LS1	HeadPhone-3	
32	10	L1,L2,L3,L4,L5,L6, L7,L11,L12,L13	FB	
33	3	L8,L9,L10	2.2uH	
34	1	M1	4mm-Microphone	http://www.bang-tec.com.tw
35	1	Q1	2N9012	
36	2	Q2,Q3	SI2301	
37	6	RN1,RN4,RN9, RN10,R13,R15	4.7K	
38	18	RN2,RN3,R16,R38 ,R39,R40,R41,R42 ,R43,R49,R50,R51 ,R52,R53,R54,R60 ,R61,R62	10	
39	12	RN5,RN6,RN7,R7, RN8,R36,R46,R59, R77,R79,R80,R81	10K	
40	4	RN11,R25,R37, R56	33	
41	1	R1	8.2K	
42	1	R2	1.6K	
43	1	R3	5.6K	
44	3	R4,R11,R57	5.1K	
45	7	R5,R6,R12,R14, R30,R45,R55	82	
46	13	R8,R34,R35,R44, R47,R48,R63,R70, R72,R74,R75,R76, R82	100K	
47	2	R9,R23	390k	
48	1	R10	91K	
49	2	R17,R71	200K	
50	2	R18,R22	2.2	

51	1	R19	2.49K-1%	
52	1	R64	10M	
53	2	R65,R66	1M	
54	2	R67,R68	12.1K	
55	1	R69	250	
56	1	R73	14K	
57	1	R78	45K	
58	1	S1,S2,S3	Bottom Key	
59	1	U1	ISD8101	http://www.nuvoton.com
60	1	U2	APL3511A	http://www.anpec.com.tw
61	1	U3	RTL8201F-QFN-32	http://www.realtek.com
62	1	U4	W55FA92DDN	http://www.nuvoton.com
63	1	U5	HY27US08121A	http://www.hynix.com
64	1	U6	W25QXXX-16	http://www.winbond.com
65	1	U8	ICL-232E	
66	1	U9	APL3203	http://www.anpec.com.tw
67	1	U10	APW7176	http://www.anpec.com.tw
68	1	U11	APW7102	http://www.anpec.com.tw
69	1	U12	APL5537	http://www.anpec.com.tw
70	1	U13	HD74LV1G08A	
71	1	X1	32.768K	
72	1	X2	12MHz	
73	1	X3	25MHz	

9. NHS-N3292x-1-PC-2D02 BoM list:

Item	Quantity	Reference	Part	Reference Link
1	1	CON1	GPM1006E0	
2	1	CON2	2.00mm-180D-30X2	
3	1	CON3	2.00mm-180D-12x2	
4	1	CON4	2.54mm-180D-8x1	
5	15	C1,C2,C3,C4,C5, C6,C7,C8,C9,C15,C 16,C17,C18,C19,C2 0	1uF	
6	4	C10,C11,C12,C13	300p	
7	1	C14	2.2uF	
8	5	C21,C23,C26,C27,C 31	0.1uF	
9	4	C22,C24,C25,C28	10uF	
10	1	C29	47uF/6.3V	
11	1	C30	100uF/6.3V	
12	4	D1,D2,D3,D4	RB521	
13	4	LED1,LED2,LED3, LED4	Green	
14	4	LED5,LED6,LED7, LED8	RED	
15	1	L1	22uH	
16	1	L2	FB	
17	1	Q1	2N9013	
18	2	RN1,RN2	82	
19	1	R1	10	
20	1	R2	4.7K	
21	5	R3,R4,R5,R6,R7	15K-1%	
22	1	R8	12K-1%	
23	1	R9	20K-1%	
24	2	R10,R15	10K	
25	2	R11,R13	5.1K	
26	1	R12	100K	
27	1	R14	2.2	
28	1	S1,S2,S3,S4,S5,S6	Bottom Key	
29	1	U1	AKU230	http://www.mostyle.com
30	1	U2	APW7136	http://www.anpec.com.tw

10. NHS-CMOS-1-PC-2D12 BoM list:

Item	Quantity	Reference	Part	Reference Link
1	1	CON1	FPC-24-0.5-CMOS	
2	1	CON2	2.00mm-180D-12x2	
3	1	C1	100uF/6.3V	
4	3	C2,C3,C5	1uF	
5	1	C4	47uF/6.3V	
6	2	C6,C7	0.1uF	
10	2	R2,R3	1K	
11	1	R5	100K	
12	1	R6	220K	
13	1	U1	NTC3705U	

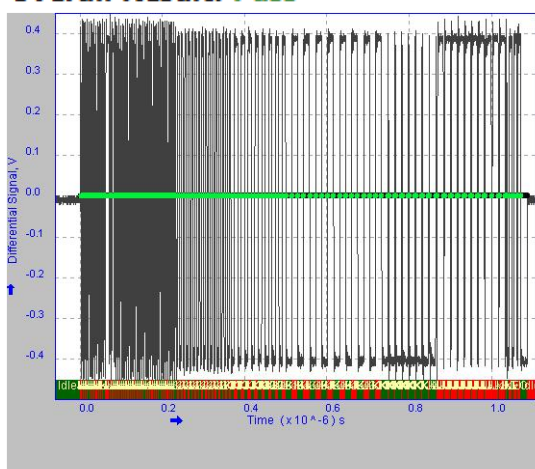
11. USB HOST 2.0 High speed signal quality report: Signal Quality Test Results in Tek format

Device ID: N3292x-DevelopmentBoard-V2.0 (USB Host side)

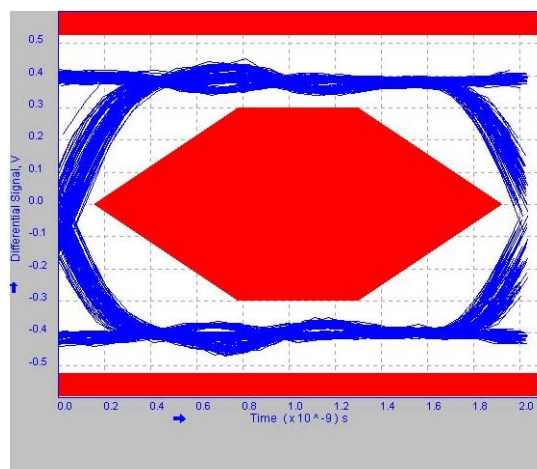
Device Description: High Speed, Near End Device, Down Stream Testing, Tier 6, Dummy Device.

Date: Wed Aug 14 20:55:19 CST 2013

Overall Result: Pass*



Waveform Plot



Eye Diagram

Results based on USB-IF / Waiver Limits :

Measurement Name	Minimum	Maximum	Mean	pk-pk	Standard Deviation	RMS	Population	Status
Monotonic Property	-	-	-	-	-	-	0	Pass
Eye Diagram Test	-	-	-	-	-	-	-	Pass
Signal Rate	459.3640Mbps	504.6971Mbps	480.0399Mbps	0.0000bps	11.31846Mbps	480.2709Mbps	513	Pass
EOP Width	-	-	16.63779ns	-	-	-	1	Pass
EOP Width (Bits)	-	-	7.986802	-	-	-	1	Pass
Rise Time	522.2439ps	606.2642ps	563.6668ps	84.02032ps	16.19632ps	563.8973ps	107	Pass
Fall Time	505.6346ps	650.3643ps	575.6066ps	144.7297ps	31.02378ps	576.4342ps	107	Pass

Monotonicity test is performed on the test limits of 15.0% and 85.0%.

Additional Information :

Consecutive Jitter range : -112.2ps to 117.0ps RMS Jitter 47.09ps

KJ Paired Jitter range : -53.17ps to 67.61ps RMS Jitter 18.71ps

JK Paired Jitter range : -68.37ps to 46.94ps RMS Jitter 23.33ps

*The Overall Result for this test is **Pass**, because one or more individual status of the measurements is **Pass**. For this test, the recommended configuration for USB2 testing (as per USB-IF) is on Tier 1.

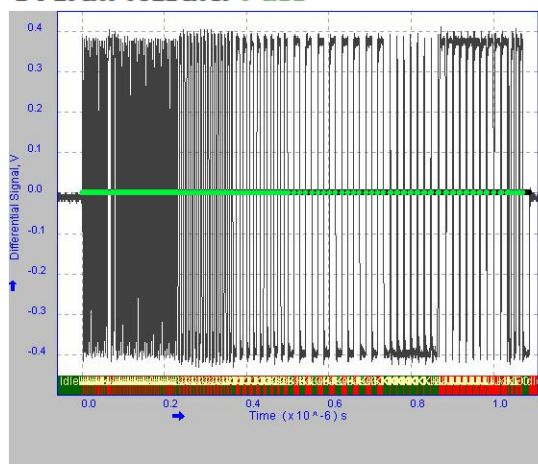
12. USB Device 2.0 High speed signal quality report: Signal Quality Test Results in Tek format

Device ID: N3292x-DevelopmentBoard- V2.0 (USB Device side)

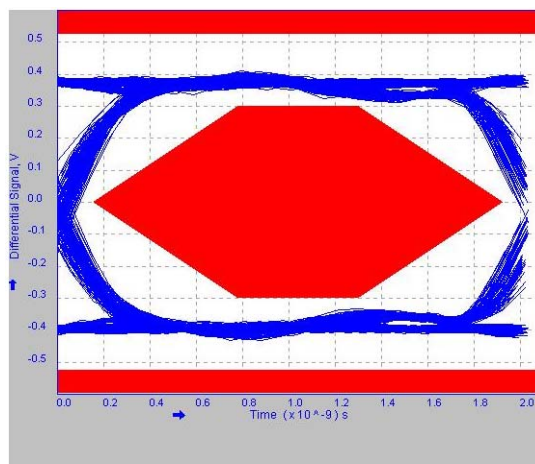
Device Description: High Speed, Near End Device, Up Stream Testing, Tier 1, Dummy Device.

Date: Wed Aug 14 19:13:54 CST 2013

Overall Result: **Pass***



Waveform Plot



Eye Diagram

Results based on USB-IF / Waiver Limits :

Measurement Name	Minimum	Maximum	Mean	pk-pk	Standard Deviation	RMS	Population	Status
Monotonic Property	-	-	-	-	-	-	0	Pass
Eye Diagram Test	-	-	-	-	-	-	-	Pass
Signal Rate	464.7607Mbps	496.7155Mbps	480.0154Mbps	0.0000bps	9.758221Mbps	480.1606Mbps	513	Pass
EOP Width	-	-	16.66384ns	-	-	-	1	Pass
EOP Width (Bits)	-	-	7.998899	-	-	-	1	Pass
Rise Time	445.3191ps	604.1985ps	517.6635ps	158.8793ps	51.87130ps	520.2317ps	107	Pass
Fall Time	470.7161ps	600.1797ps	521.1462ps	129.4636ps	37.25526ps	522.4638ps	107	Pass

Monotonicity test is performed on the test limits of 15.0% and 85.0%.

Additional Information :

Consecutive Jitter range : -99.24ps to 95.16ps RMS Jitter 39.24ps

KJ Paired Jitter range : -69.98ps to 47.60ps RMS Jitter 17.47ps

JK Paired Jitter range : -33.87ps to 45.66ps RMS Jitter 13.46ps

*The Overall Result for this test is **Pass**, because one or more individual status of the measurements is **Pass**. For this test, the recommended configuration for USB2 testing (as per USB-IF) is on Tier 1.

13. FAQ:

Q1: If cannot turn-on the system power?

A1: Please check LED14 (Red LED) is lit.

If yes, the adaptor voltage is over 6.0V or system current is too high.

Q2: EMAC cannot work?

A2: Please check J6~J15 whether to switch to the RMII interface.

Q3: CMOS2 cannot work?

A3: Please check J6~J15 and J20~J21 whether to switch to the CMOS_2 interface.

Q4: SDIO cannot work?

A4: Please check J23 whether to short and touch panel whether to disconnect.

Q5: Debug port no any signal (GPC8~15 and GPE0~1)?

A5: Please check J6~J15 whether to switch to the CMOS_2 interface.

Q6: Digital microphone cannot work?

A6: Please check J2-J3 (NHS-N3292x-1-PC-2D02) has short.

Q7: SPI Flash cannot work?

A7: Please check J5 has switch to (1-2)

Important Notice

Nuvoton products are not designed, intended, authorized or warranted for use as components in systems or equipment intended for surgical implantation, atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, or for other applications intended to support or sustain life. Furthermore, Nuvoton products are not intended for applications wherein failure of Nuvoton products could result or lead to a situation wherein personal injury, death or severe property or environmental damage could occur.

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